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A sequentially coupled shape and topology optimization method
Zhijun Wang1*, Akke S.J. Suiker1, Hèrm Hofmeyer1, Twan van Hooff1,2, Bert Blocken1,2
1 Department of the Built Environment, Eindhoven University of Technology
2 Department of Civil Engineering, KU Leuven
* Email address: z.wang@tue.nl

Coupled method (2D)

- Structural design problem
  - Minimizing the compliance c of a structure with volume V constraint, e.g. as shown in Fig. 1.
    - Shape optimization (SO).
    - Topology optimization (TO).

- Research gap
  - Initial design
  - NURBS-based SO
  - NURBS-based TO

- Coupled optimization model
  - Consider both shape (a) and topology (p) design variables.

- Sequential solution strategy
  - Solving the coupled model by performing TO and SO iteratively.

Application (3D & 2.5D)

- 3D design problem
  - Coupled optimization for 3D structure shown as following example.

- 2.5D design problem
  - Coupled optimization of a 2.5D beam-type structure shown in Fig. 2.

- Conclusions and future work
  - An optimization framework aims to optimally place a given amount of material in an optimal design domain, implemented to solve 2D, 2.5D and 3D design problems.
  - The results of representative case studies clearly show that the features of the design domain can have a large influence on the final topology.
  - Future work: solving the coupled optimization model in a parallel manner, and incorporating the aerodynamic analysis in the framework for wind turbine blade design.